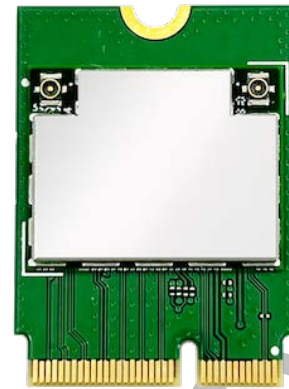


WNFQ-290BE

WiFi 7 2x2 MU-MIMO

802.11be Tri-band 2.4GHz/5GHz/6GHz

2T2R Wi-Fi M.2 module



Wi-Fi Combo Solution M.2 Module

WNFQ-290BE, first Qualcomm based WiFi-7 (802.11be) module in M.2 2230 E key formfactor, running PCIe (Wifi) and USB, with Tri-band capability (2.4GHz, 5GHz, and 6GHz). WNFQ-290BE supports single band operation on 2.4GHz with 5GHz, or 6GHz, and support IEEE802.11 be/ax/ac/a/b/g/n protocol, up to 160MHz mode.

WNFQ-290BE designed with 2 spatial streams (2T2R, or 2x2) in MU-MIMO mode. With a standard M.2 E key 2230 formfactor, WNFQ-290BE can accommodate to all existing platform that has M.2 Adaptor pre-integrated, no extra work with platform design.

Software wise WNFQ-290BE support Linux (Open Source) in the near future. The module is capable to run on both x86 platform and ARM based platform, and supports STA mode and Soft AP Mode*, recommend to run on application includes: digital signage/POS, rugged computer / tablets, fanless automation PC and other industrial environment applications that requires high speed data transmission.

Embedded Application

Applications include IPC/ Advertising machine/ OTT/ IPTV/ DVB/ STB / DV/ Mini Driving Recorder/ Intelligent Projector Pico/ VR/ AR terminal/ POS machine/ Vehicle mounted front/ Rear Terminal UAV/ Robot/ Intelligent Gateway/ Smart city and other electronic products.

Key Feature

- Compliant with IEEE 802.11 be/ax/ac/a/b/g/n
- Support Multi-link Operation (MLO)
- Supports 2x2 Multi-User Multiple-Input Multiple-Output (MU-MIMO)
- Channel bandwidth up to 40 MHz at 2.4 GHz, up to 160 MHz at 5 GHz and 6 GHz
- Support tri-band 2.4 GHz/5 GHz/6 GHz
- Support up to 4096 QAM modulation at each band

Specification

Standards	IEEE 802.11be/ax/ac/a/b/g/n (2T2R)
Chipset	Qualcomm QCC2073
Data Rate	802.11b: 11Mbps 802.11a/g: 54Mbps 802.11n: MCS0~15 802.11ac: MCS0~9 802.11ax: MCS0~13 802.11be: MCS0~13
Operating Frequency	IEEE 802.11 be/ax/ac/a/b/g/n ISM Band, 2.400GHz~2.4835GHz, 5.150GHz~5.850GHz, 5.925~7.125GHz *Subject to local regulations
Interface	WLAN: PCIe / USB
Form Factor	M.2 2230 E Key
Antenna	2 x IPEX MHF4 connectors Main: WiFi Aux: WiFi
Modulation	Wi-Fi: 802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11n: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11a: OFDM (BPSK, QPSK, 16-QAM, 64-QAM) 802.11ac: OFDM (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM) 802.11ax: OFDMA (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM, 4096QAM) 802.11be: OFDMA (BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM, 1024-QAM, 4096-QAM)
Power Consumption	11be TX mode: 802 mA (MAX) RX mode: 407mA (MAX)
Operating Voltage	DC 3.3V
Operating Temperature Range	-10°~+65°C (Operating)
Storage Temperature Range	-40°C~85°C
Humidity	5%~90% (Operating)

(Non-Condensing)	5%~90% (Storing)
Dimension L x W x H (in mm)	30mm(± 0.15mm) x 22mm(± 0.15mm) x 2.6mm(± 0.3mm)
Weight (g)	2.91g
Driver Support	Linux (Open Source)
Security	WPS2.0, WAPI, WPA, WPA2, WPA3

Preliminary

OUTPUT POWER & SENSITIVITY		
802.11b		
Data Rate	Tx \pm 1.5 dBm	Rx Sensitivity
11Mbps	18 dBm	\leq -91 dBm

802.11g		
Data Rate	Tx \pm 1.5dBm	Rx Sensitivity
54Mbps	16 dBm	\leq -77.5 dBm

802.11n / 2.4GHz				
	Data Rate	Tx \pm 1.5 dBm (1TX)	Tx \pm 1.5 dBm (2TX)	Rx Sensitivity
HT20	MCS7	16.5 dBm	19.5 dBm	\leq -76.5 dBm
	MCS7	14.5 dBm	17.5 dBm	\leq -74 dBm

802.11a		
Data Rate	Tx \pm 2dBm	Rx Sensitivity
54Mbps	16 dBm	\leq -76.5 dBm

802.11n / 5GHz				
	Data Rate	Tx \pm 2 dBm (1TX)	Tx \pm 2 dBm (2TX)	Rx Sensitivity
HT20	MCS7	15dBm	18 dBm	\leq -76 dBm
	MCS7	14.5 dBm	17.5 dBm	\leq -73.5 dBm

802.11ac				
	Data Rate	Tx \pm 2 dBm (1TX)	Tx \pm 2 dBm (2TX)	Rx Sensitivity
VHT80	MCS9	13 dBm	16 dBm	\leq -64.5 dBm
VHT160	MCS9	13 dBm	16 dBm	\leq -62 dBm

802.11ax / 2.4 GHz				
	Data Rate	Tx \pm 1.5 dBm (1TX)	Tx \pm 1.5 dBm (2TX)	Rx Sensitivity
HE40	MCS11	14.5 dBm	17.5 dBm	\leq -62 dBm

802.11ax / 5GHz				
	Data Rate	Tx \pm 2 dBm (1TX)	Tx \pm 2 dBm (2TX)	Rx Sensitivity
HE20	MCS11	13 dBm	16 dBm	\leq -64 dBm
	MCS11	12.5 dBm	15.5 dBm	\leq -61.5 dBm

HE80	MCS11	12.5 dBm	15.5 dBm	≤ -58.5 dBm
HE160	MCS11	12.5dBm	15.5 dBm	≤ -55.5 dBm
HE20	MCS13	12 dBm	15 dBm	≤ -58 dBm
HE40	MCS13	12 dBm	15 dBm	≤ -55 dBm
HE80	MCS13	12 dBm	15 dBm	≤ -52 dBm
HE160	MCS13	12 dBm	15 dBm	≤ -49.5 dBm

802.11ax / 6GHz				
HE20	Data Rate	Tx \pm 2 dBm (1TX)	Tx \pm 2 dBm (2TX)	Rx Sensitivity
	MCS11	12 dBm	15 dBm	≤ -63 dBm
HE40	MCS11	11.5 dBm	14.5 dBm	≤ -60.5 dBm
HE80	MCS11	11.5 dBm	14.5 dBm	≤ -57.5 dBm
HE160	MCS11	11.5 dBm	14.5 dBm	≤ -54.5 dBm
HE20	MCS13	11 dBm	14 dBm	≤ -57 dBm
HE40	MCS13	11 dBm	14 dBm	≤ -54 dBm
HE80	MCS13	11 dBm	14 dBm	≤ -51 dBm
HE160	MCS13	11 dBm	14 dBm	≤ -48.5 dBm

802.11be / 2.4 GHz				
EHT40	Data Rate	Tx \pm 1.5 dBm (1TX)	Tx \pm 1.5 dBm (2TX)	Rx Sensitivity
	MCS11	14.5 dBm	17.5 dBm	≤ -62 dBm

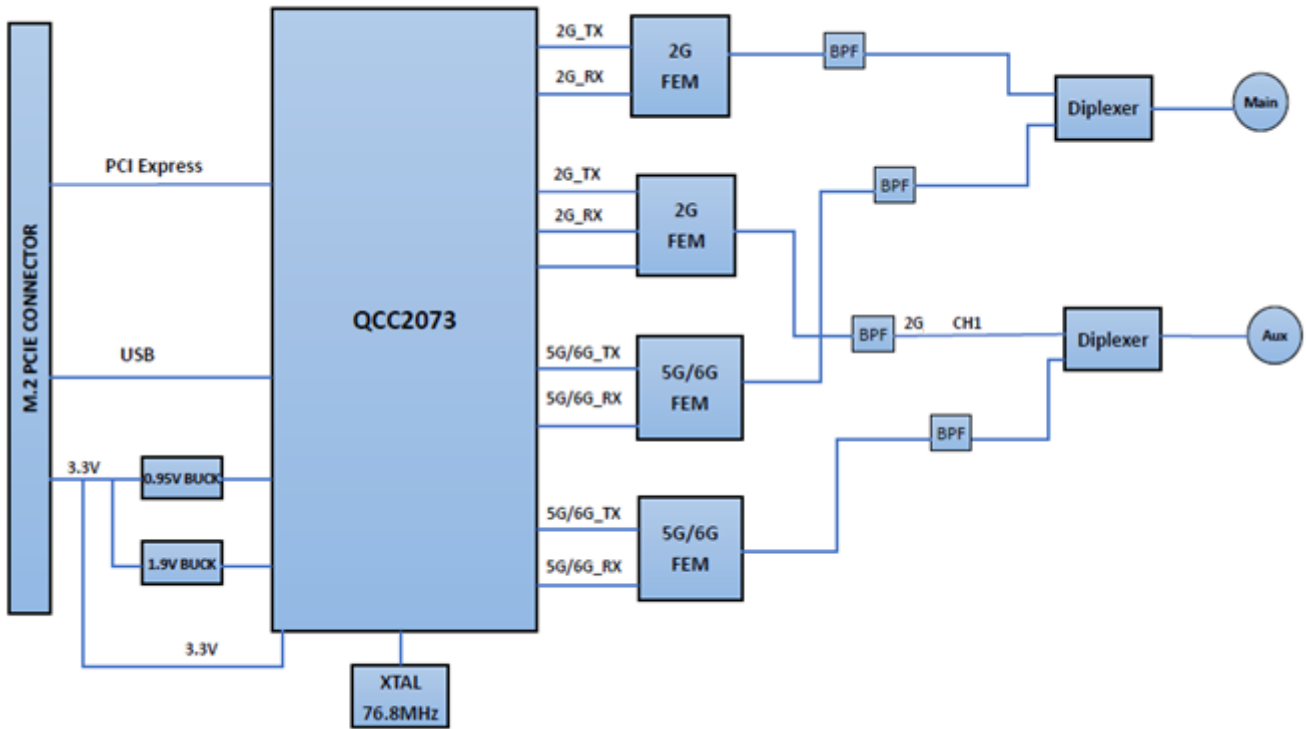
802.11be / 5GHz				
EHT20	Data Rate	Tx \pm 2 dBm (1TX)	Tx \pm 2 dBm (2TX)	Rx Sensitivity
	MCS11	13 dBm	16 dBm	≤ -64 dBm
EHT40	MCS11	12.5 dBm	15.5 dBm	≤ -61.5 dBm
EHT80	MCS11	12.5 dBm	15.5 dBm	≤ -58.5 dBm
EHT160	MCS11	12.5dBm	15.5 dBm	≤ -55.5 dBm
EHT20	MCS13	12 dBm	15 dBm	≤ -58 dBm
EHT40	MCS13	12 dBm	15 dBm	≤ -55.5 dBm
EHT80	MCS13	12 dBm	15 dBm	≤ -52.5 dBm
EHT160	MCS13	12 dBm	15 dBm	≤ -49.5 dBm

802.11be/ 6GHz				
EHT20	Data Rate	Tx \pm 2 dBm (1TX)	Tx \pm 2 dBm (2TX)	Rx Sensitivity
	MCS11	12 dBm	15 dBm	≤ -63 dBm
EHT40	MCS11	11.5 dBm	14.5 dBm	≤ -60.5 dBm

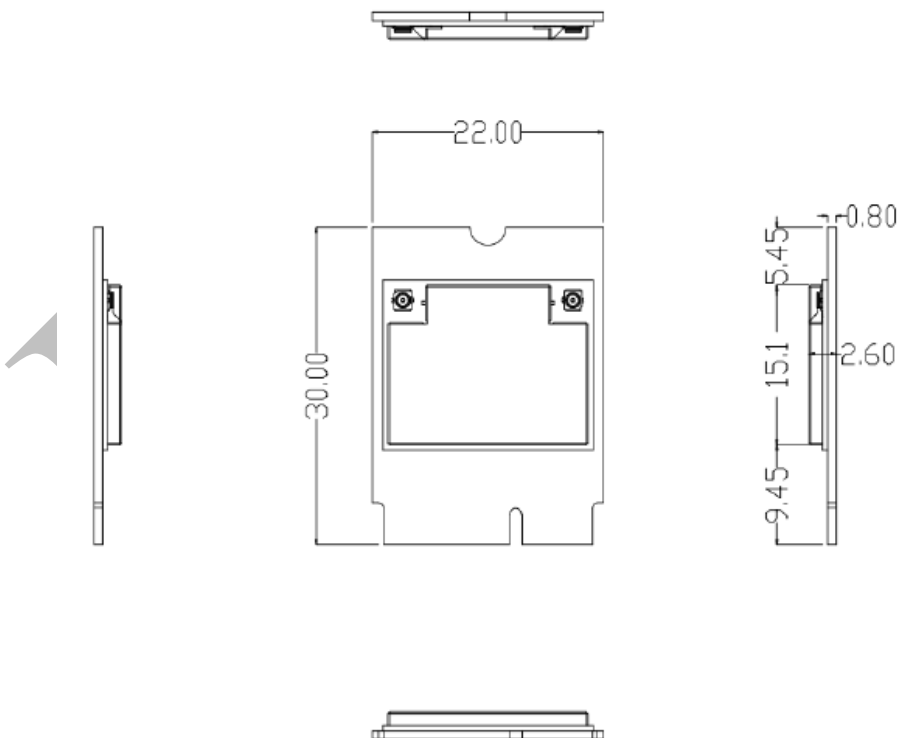
EHT80	MCS11	11.5 dBm	14.5 dBm	≤ -57.5 dBm
EHT160	MCS11	11.5 dBm	14.5 dBm	≤ -54.5 dBm
EHT20	MCS13	11 dBm	14 dBm	≤ -57 dBm
EHT40	MCS13	11 dBm	14 dBm	≤ -54.5 dBm
EHT80	MCS13	11 dBm	14 dBm	≤ -51.5 dBm
EHT160	MCS13	11 dBm	14 dBm	≤ -48.5 dBm

Preliminary

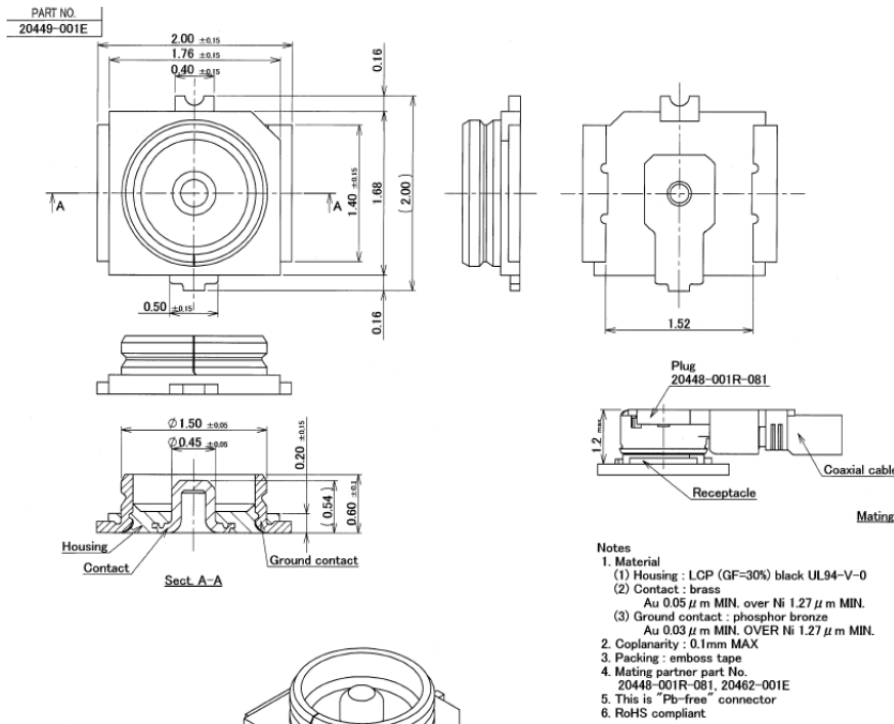
Block Diagram



Mechanical Dimension (mm)



MHF4 connector spec.



Pin Assignment (TBD)

The following section illustrate signal pin-outs for the module connector.

Certification (TBD)

- | | |
|------------------------------|---|
| <input type="checkbox"/> FCC | <input type="checkbox"/> CE (RED EN 300 328 V2.2.2 / EN 301 893 V2.1.1) |
| <input type="checkbox"/> IC | <input type="checkbox"/> MIC |
| <input type="checkbox"/> NCC | <input type="checkbox"/> ASNZS |

Ordering Information

Product Name	Part Number	Description
WNFQ-290BE	R9701B10002	11be/ax/ac/a/b/g/n 2T2R Wi-Fi M.2 Module

Optional Accessory(TBD)

Product Name	Part Number	Description
AD-510AX	R3410A10051	Dipole Antenna,2.27dBi/2.69dBi/3.52dBi/2.4G/5G/6GHz,RP-SMA(M)connector
CBIRF-NE150	R3470300025	RF Cable, I-PEXMHF4 to RP-SMA(F); L150mm; Coaxial 0.81 Black
CBIRF-NE250	R3470300026	RF Cable, I-PEXMHF4 to RP-SMA(F); L250mm; Coaxial 0.81 Black

Preliminary